ICT-Based Lombok Disaster Management Communication Model in Indonesian

Modelo de comunicación de gestión de desastres de Lombok fundamentado en TIC en Indonesia

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Abstract: When a natural disaster occurs, information and communication technology (ICT)-based disaster communication must be carried out, especially from the government to the affected community. The needs for information on the location and the number of victims and data collection on their needs are highly required to ease officers and volunteers to assist disaster victims. When an earthquake occurred on July 29, 2018, the community was in a state of panic, anxiety, and fear, making it prone to the confusion of information, resulting in slow disaster management. This study aims to determine the communication model of Lombok earthquake disaster management based on ICT carried out by the Public Relations of the North Lombok Regency Government to the people of Gangga Village, North Lombok. This research utilized a descriptive qualitative method by conducting in-depth interviews with the Public Relations of the North Lombok Regency Government, the people of Gangga Village, North Lombok Regency, and the North Lombok Regional Disaster Management Agency (BPBD). The results disclosed that the ICT-based disaster communication model during the July 29, 2018 earthquake integrated related Regional Work Units (SKPDs), such as the Public Relations, BPBD, Public Works Service, and Health Service through Handy Talky (HT), Hand Phone (HP), websites, and social media. The North Lombok Regency Government also explicitly coordinated with the Ministry of Communication and Information, who asked the NTB Regional Frequency Spectrum Monitoring Center to continuously coordinate with

telecommunications operators, ORARI, and RAPI in NTB to ensure excellent telecommunications services for the community.
Keywords: Disaster Communication; Information and Communication Technology (ICT); Model

Resumen: Cuando ocurre un desastre natural, se debe llevar a cabo una comunicación de desastres basada en tecnologías de la información y la comunicación (TIC), especialmente del gobierno a la comunidad afectada. Las necesidades de información sobre la ubicación y el número de víctimas y la recopilación de datos sobre sus necesidades son muy necesarias para facilitar que los oficiales y voluntarios ayuden a las víctimas del desastre. Cuando ocurrió un terremoto el 29 de julio de 2018, la comunidad estaba en un estado de pánico, ansiedad y miedo, lo que la hizo propensa a la confusión de información, lo que resultó en una gestión lenta del desastre. Este estudio tiene como objetivo determinar el modelo de comunicación de la gestión de desastres del terremoto de Lombok basado en las TIC llevado a cabo por Relaciones Públicas del Gobierno de la Regencia de North Lombok para la gente de Gangga Village, North Lombok. Esta investigación utilizó un método cualitativo descriptivo mediante la realización de entrevistas en profundidad con Relaciones Públicas del Gobierno de la Regencia de North Lombok, la gente de Gangga Village, la Regencia de North Lombok y la Agencia Regional de Gestión de Desastres de North Lombok (BPBD). Los resultados revelaron que el modelo de comunicación de desastres basado en TIC durante el terremoto del 29 de julio de 2018 integró Unidades de Trabajo Regionales (SKPD) relacionadas, como Relaciones Públicas, BPBD, Servicio de Obras Públicas y Servicio de Salud a través de Handy Talky (HT), Mano Teléfono (HP), sitios web y redes sociales. El Gobierno de la Regencia de Lombok del Norte también se coordinó explícitamente con el Ministerio de Comunicaciones e Información, quien solicitó al Centro Regional de Monitoreo del Espectro de Frecuencias de NTB que coordine continuamente con los operadores de telecomunicaciones, ORARI y RAPI en NTB para garantizar excelentes servicios de telecomunicaciones para la comunidad.

1. INTRODUCTION

Communication is a necessity in social life, where through it, humans can relate to each other personally, in society, and communicate with the government. Communication has an essential role in human life. Ruben (Bulaeng, 2013) comprehensively described communication as a process through which individuals build relationships with groups, organizations, and society, create, transmit, and use the information to coordinate their environment.

The importance of communication requires the needs for the role of communication in dealing with a disaster. Disaster communication has more complexity and becomes crucial to reduce disaster risk and loss of life when a disaster occurs. When a natural disaster occurs, effective disaster communication involving information and communication technology (ICT) must be carried out, especially from the government to the affected community. In this case, the priority must be on communication, information, coordination, and cooperation (KIKK) (Budi HH, 2012). An integrated information and communication system for disaster management is very important. The system overcomes the flow bottleneck for an integrated information system. If communication is hampered, information and data of survivors become invalid and unclear. As a result, the distribution of aid is not right on target, delays in medical action to victims, thereby reducing the risk of communication (Barata et al., 2017).

Indonesia has a high disaster record, one of which is an earthquake in Lombok. The earthquake that hit Lombok was the highest number of earthquakes in the near future. Historically, an earthquake with a magnitude of 6.4 rocked North Lombok on Sunday, July 29, 2018. A week later, on August 5, 2018, at 18:46 WIB, North Lombok was again shaken by an earthquake with a magnitude of 7.0, of which the center was on land, 18 km northwest of East Lombok and was the mainshock (main quake) of the earthquake on July 29, 2018 (Reuters, 2018). North Lombok Regency became the area with the worst damage caused by the earthquake in 2018. As the organizer of the regional government, the North Lombok Regency Government also has the responsibility and authority in disaster management, following Article 5 of the Law of the Republic of Indonesia No. 24 of 2007 concerning Disaster Management.

Considering that communication during a disaster requires a fast process and should not go through a long bureaucracy, information delivery with ICT support must be performed quickly, precisely, and accurately (Budi HH, 2012b). The needs for information regarding the location and the number of victims and data collection on the victims' needs are necessary to facilitate officers and volunteers in assisting victims (Mahdia & Noviyanto, 2013) because, in the field, there are conditions of panic, anxiety, and information gaps and it is uneven. Public Relations of the North Lombok Regency Government is one of the government apparatus responsible for conveying information and communicating to the public, considering the duties and

functions of Public Relations, namely conveying information and communicating to internal and external government.

Effective disaster communication involving ICT with internet technology facilitates the handling of natural disasters in affected areas. Current technological developments ease the public in accessing vital information about disasters that will benefit the efficiency of disaster management (Asteria, 2016). Government Public Relations functions to provide services to the public regarding information and mobilize public participation in the success of government policies by upholding the principle of openness. In the era of information disclosure, the public has the right to obtain correct and non-discriminatory information, including information and communication about disasters occurring in their area. Thus, the role of Government Public Relations in carrying out the function of communication and information to the public during a disaster is vital (Nurjanah et al., 2019).

2. LITERATURE REVIEW

The previous research that also strengthened and inspired the writer was the research conducted by Sosiawan, entitled The Ideal Model of Information Technology and Communication Management to Support Natural Disasters Management (2014). The results of his research indicate that the ideal model of ICT management in disaster management operations requires the addition of the Technology Affairs Section in the structure of the Regional Disaster Management Agency (BPBD) (Sosiawan, 2014).

Furthermore, the second research is a research entitled Communication Model for Mount Merapi Disaster Management through the Plewengan Application which was delivered by Barata, Lestari and Hendraningrum (2017). The Plewangan application was developed by the Agency for Research and Development of Geological Disaster Technology (BPPTKG). The results of this study are that the Plewangan Plewangan Application Readiness cannot be used optimally through an android smartphone, the target audience is the people of Yogyakarta, the readiness of supporting institutions such as BBPTKG is ready, the media is used to share information in the form of mass media, traditional, social media, and find models. communication for the Plewangan Application involving Primary Stakeholders, Premiere Stakeholders, Secondary Stakeholders who can be identified, interested, and finally able to access so that the function of implementing the Plewangan Application can be precise. target and optimal (Barata et al., 2017).

Another study that inspired the author was discussing the website-based ICT model, which was carried out by Lestar, Paripurno, Surbakti, and Pratama (2021). This research, entitled Integrated Communication and Information Model in Disaster Management in Karo Regency, is Web-Based which is based on problems, has research results showing that the Karo Regency Community is suing the Karo Regional Government (Pemda) for not providing an integrated communication and

information system in the management of the Mount Sinabung disaster. . The results of this study found an integrated model of communication and information in disaster management in Karo Regency. This research contributes in the form of recommendations for integrated communication and information models in disaster management in Karo Regency through the website. The new findings theoretically add an element of critical thinking in Source-Message-Channel-Receiver-Critical Thinking-Effective Theory to deal with disaster problems (Lestari et al., 2021).

Based on several previous studies, it shows the importance of ICT communication tools to support the disaster communication process. However, in general, the communication charged to previous research has not discussed the collaboration of disaster communication carried out by Government Public Relations, BPBD and BPTKG who also play an active role in delivering disaster communication. So in this study will fill the gap of previous research related to how communication model of the Public Relations of the North Lombok Regency Government in the communication technology network in conducting disaster communication supporting government operations in the development and, particularly, the prevention and management of natural disasters. Based on this background, this study aims to determine the implementation of the ICT-based communication model used by the Public Relations of the North Lombok Regency Government in implementing disaster communication. This study explored in-depth the phenomenon of utilizing communication technology networks within the North Lombok Government.

This is based on the realization that ICT plays an essential role in tackling and providing an early warning before a disaster occurs. An early warning system in dealing with disasters is critical, considering that geologically and climatologically, Indonesia's territory is a natural disaster-prone area. Therefore, it is necessary to study an ICT-based communication model to support prevention, response, and operational assistance in a natural disaster. As stated that integrated communication and information model on disaster is important to provide an explanation of the integrated communication and information process quickly, precisely, and accurately for saving people and property (Barata et al., 2017).

2.1 Government Public Relations

According to Cultip, Center & Broom in the book Effective Public Relations, Public Relations is a management function that builds and maintains excellent and beneficial relationships between an organization and the public that affect the success or failure of the organization. One of the functions of Public Relations is to establish communication relations with the organization's publics. The impact of this function realization is the achievement of organizational goals, where the purpose of Public Relations is to obtain, improve and maintain an excellent and profitable reputation to gain support from the public, and policies or programs can run following their goals.

The organization's goals are achieved through Public Relations activities by increasing, maintaining, or improving the prestige of the organization, detecting and dealing with emerging issues, and overcoming misunderstandings and prejudices (Cutlip et al., 2013).

2.2 Disaster Communication

A disaster refers to a severe disturbance to the community, resulting in loss of life and material or loss to the environment so that the affected community cannot cope on their own. Meanwhile, disaster management is a collective term covering all aspects of planning in response to a disaster emergency, including pre-disaster and post-disaster activities (Toha, 2007). There are four activities faced during a disaster: mitigation, preparedness, response, and normalization. Mitigation is an activity to prevent a disaster from happening or reduce the effects of a disaster. Shaw and Gupta explained that the communication aspect in disaster management plays an important role. In the aspect of the disaster management cycle, communication is necessary (Shaw et al., 2009). Before a disaster occurs, the communication aspect is related to the provision of accurate information, coordination, and cooperation aspects, especially to people vulnerable to disasters. Activities that can be carried out are prevention and risk reduction, such as preparedness for possible disasters and dissemination of early warnings. When a disaster strikes, KIKK are the keys to success in disaster management. Various activities that can be carried out are rapid response, provision of assistance, mobilization of search and rescue, and damage assessment. In post-disaster situations, communication aspects are required during reconstruction and post-disaster recovery.

Disaster management is also a shared responsibility between the government, the private sector, and civil society. Partnerships between the government and the private sector are prerequisites for sustainable and effective disaster management. Likewise, cooperation between government agencies is equally crucial due to the cross-cutting nature of disaster management (Sosiawan, 2014).

2.3 Information and Communication Technology (ICT)

Communication with the help of technology will ease the government to convey information, especially in a disaster situation that demands to convey information quickly, precisely, and accurately (Budi HH, 2012b). Information technology management is a combination of technology management and information technology that aims to achieve organizational goals using computers. From this definition, information technology management means the management of a set of several systems, infrastructure, and information contained therein (Turban et al., 2006). Furthermore, there are two components in the ICT management—first, the components of a functional management information system. Components of this

information system are all related to the techniques of data collection, processing, delivery, storage, and presentation of information required for management. Second, the components of the physical management information system, namely the entire physical device and equipment used to run the management information system (O'Brien, 2004).

3. METHODOLOGY

This research on the ICT-based communication model of Lombok disaster management applied a case study method with a qualitative descriptive approach. Moleong stated that qualitative research methods do not carry out calculations, thus having findings not obtained using statistical procedures or other means of quantification (Moleong, 2017). In this study, data were collected using in-depth interviews with that the purpose of the research is to understand the views and opinions of individuals from a limited background in order to get in-depth information (Prihantoro et al., 2022), and secondary data were obtained through literature studies and related documents. Specifically, this research revealed (1) disaster communication conducted by the Public Relations of the North Lombok Regency Government and (2) disaster management communication model in North Lombok.

4. RESULT AND DISCUSSION

4.1 *Public Relations of the Lombok Regency Government Conducted Disaster Communication*

In the implementation of disaster communication before, during, and after the 2018 earthquake, the Regional Government Work Units (SKPDs) participated in disaster management. In general, the SKPDs responsible for this disaster issue are the ones with the main tasks and functions responsible for informing the public. In the interview, the Public Relations of the North Lombok Regency Government, Mujaddid Muhas, M. A., stated that the BMKG and the mass media were crucial in informing the pre-disaster situation. Meanwhile, when a disaster occurred, it developed and expanded. SAR, the Indonesian National Armed Forces or the Republic of Indonesia Police (TNI/POLRI), the Regional Disaster Management Agency (BPBD), the Civil Service Police Unit (SatPol PP) and firefighters, the Health Service, Regional Hospitals, Social Service for Women's Empowerment and Child Protection (DSPPA), Information and Statistics Communication Service (Kominfotik), philanthropic institutions (NGOs), Fire Prevention and Fighting Service and Village Community Administration Agency (DP2KBPMD), State/Regional-Owned Enterprises (BUMN/BUMD), Village Heads Association (AKAD/Association of Village Heads throughout North Lombok) have played an

essential role in disaster management. The post-disaster focused more on handling the recovery of the situation so that the SKPDs in charges, such as BPBD, DSPPA, NGOs, and partnership forums, were formed.

Similar to Cutlip & Center, Public Relations of Lombok Regency Government established communication relations with the public and fellow government organizations. It aims to support conveying information related to pre-disaster prevention, conveying information and coordinating quickly with related SKPDs during disasters, and collaborating with BPBD and other social institutions to educate the public. Hence, they will learn and understand what to do in the aftermath of a disaster. The impact of this function realization is the achievement of organizational goals, where the objectives of the Public Relations of the North Lombok Regency Government are to obtain, improve, and maintain a good and profitable reputation to gain support from the public as well as policies or programs related to the disaster.

The Public Relations of the North Lombok Regency Government carried out communication activities through manual or conventional and digital media.

> "To support disaster communication activities, we use manual or conventional media such as announcements through the funnel of houses of worship, kulkul/kentongan, a notification from person to person or through meetings in the community. In addition, it also uses information and communication technology, namely through digital media such as short message services, WhatsApp groups, official websites, media coverage, especially radio television, print and online," Mujaddid Muhas, Public Relations of the North Lombok Regency Government.

Another crucial disaster communication component is the design of disaster communication messages. Given the importance of conveying disaster-related information before, during, and after the disaster, the Public Relations of the North Lombok Regency Government arranged messages according to potential events, appeals or announcements, a chronology of events, current conditions, impacts, regulation circulars, and disaster mitigation. Public Relations performed its function to produce coverage releases, photos of events, video shows, infographics, and field coverage with regional leaders and media crews. Efforts made by the Public Relations of the North Lombok Regency Government must be persuasive, educative, and informative to reduce disaster risk. As stated by Anwar Arifin that (1) disaster communication carried out by Public Relations must be persuasive, namely influencing other people to behave according to our wishes; (2) educative, meaning that communication carried out by communicators aims to provide knowledge and education to the communicants; and (3) informative, in which the communication made by the communicators is intended to provide information to the communicants (Shita, 2016).

The Decree of the Regent of North Lombok Number 22803/HUMAS/2014 concerning the Establishment of the North Lombok Regency Bakohumas Team in 2014 aims to improve the duties and functions of Public Relations in conveying policy and development information issued by the North Lombok Regency Government. This regulation indicates that the Public Relations Government must be able to communicate in various forms, including communication using the internet to publish information. In particular, following the regulation, Public Relations has a clear main task or has adequate infrastructure for implementing ICT-based disaster communications..

4.2 *Disaster Communication Model of Public Relations of the North Lombok Government*

Effective disaster communication is a key factor for the government's success in dealing with disasters. Public Relations of the North Lombok Government Government realized that technology has been an element of success to convey information quickly and accurately to the public. ICT management supports a set of systems, infrastructure, and information contained in it (Turban et al., 2006). Therefore, the communication model of the Public Relations of the North Lombok Regency Government was carried out through the following process.
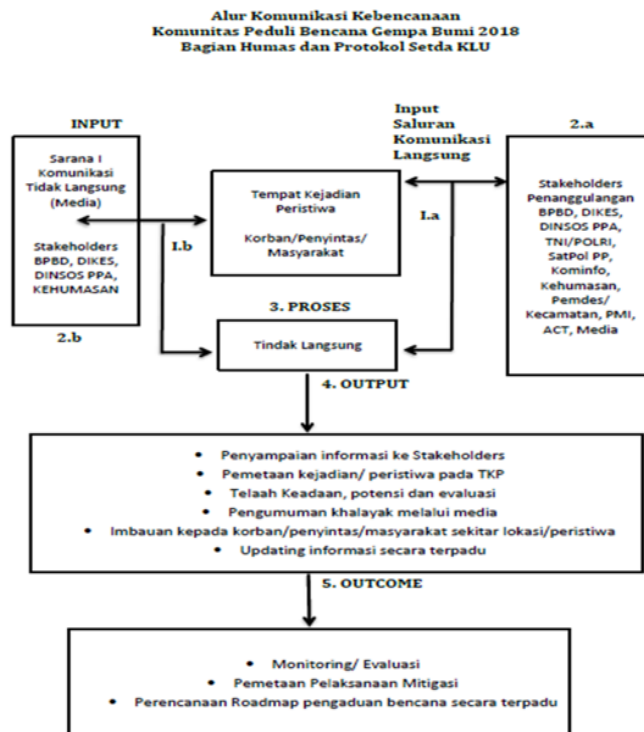
Figure 1. Disaster Communication Model of Public Relations of the North Lombok Regency Government
Source : PR Officer North Lombok Government

Description:
1. Input (I.a) (I.b)
2. Input (2.a) (2.b)
3. Process
4. Output
5. Outcome

BI. Direct communication channels could be carried out by victims/survivors/community by coming directly to the information center (media center) or the nearest disaster stakeholder office.
2. The indirect communication channels were performed through:
a. Call Center
b. Social media
c. Website

The chart displays that the government conducts disaster communication supported by the participation of the community and disaster management community both to convey information to the government, as well as to coordinate the provision of information to the mass media and relevant stakeholders such as BPBD, Health Service, DSPPA, TNI/POLRI, SatPol PP, Kominfotik, Public Relations, Village/District Government, Indonesian Red Cross Society (PMI), Quick Response Action (ACT), and media. O'Brien stated that the management of ICT requires information and communication integrally (O'Brien, 2004). Therefore, the researchers discovered that the ICT system run by the Public Relations of the North Lombok Regency Government adapted and required the participation of the community together to communicate the disaster appropriately and carry out evacuations to victims.

> "Synergy and communication related to disasters are carried out with stakeholders and the Disaster Care Community, especially conveying the steps taken by the local government and listening to the aspirations of the philanthropic community to collectively perform handling following their roles and responsibilities to handle disasters. It began with the participation in making public kitchens, refugee camps, logistics distribution, development updates, and so on. To communicate it quickly, ICT is highly required," explained Mujaddid Muhas, the Public Relations of the North Lombok Regency Government.

It is in line with what was stated by Susanto (2011). In fact, through various Subordinate Agency of State Power, the government has implemented disaster management. However, it would be even better if it formed an integrative communication network that equality involves private institutions and communities in disaster areas. In this context, ICT could play an essential role in disaster prevention, mitigation, and management. Remote sensing for early warning has been made possible by various available technologies, including telecommunications satellites, radar telemetry, and meteorology. The Public Relations of the Lombok Regency Government utilized cellphones, social media such as Whatsapp Group, Instagram, and websites to reach out to massive information dissemination and adapt the media used by communities in disaster risk areas. ICT has encompassed both traditional (radio, television) and modern media (cellular broadcasting, internet, satellite radio), all of which have played an essential role in educating the public about potential or impending disaster risks. The frequencies of radio communication media specifically for earthquake disaster management in North Lombok were the HF 7.110 MHz, VHF 145.500, and 147.000 MHz channels, and the LAPAN-ORARI IO-86 satellite. Prior to a disaster, ICT was employed as a channel for disseminating information about an impending disaster, making it possible to take the necessary safeguards to reduce the impact of the disaster (Permana et al., 2018). Therefore, it is crucial to consistently and regularly educate the public about the potential risks of disasters.

5. CONCLUSIONS

Natural disasters in North Lombok Regency utilized ICT-based disaster communication. The results revealed that the ICT-based disaster communication model in the July 29, 2018 earthquake integrated related SKPDs, comprising Public Relations, BPBD, Public Works Service, and Health Service, through Handy Talky (HT), Mobile Phone (HP), websites, and social media. The North Lombok Regency Government also explicitly coordinated with the Ministry of Communications and Information Technology, who asked the NTB Regional Frequency Spectrum Monitoring Center to continue to coordinate with telecommunications operators, ORARI, and RAPI in the NTB area to ensure proper telecommunications services for the community, especially after the BMKG informed the tsunami early warning. The frequency of radio communication media specifically for earthquake disaster management in North Lombok included HF 7.110 MHz, VHF 145.500, and 147.000 MHz channels, and the LAPAN-ORARI IO-86 satellite.

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